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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/821,404

03/29/2001

Ellen M. Eide

YOR20010072US1

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12/12/2006

(590.044)

EXAMINER

WOZNIAK, JAMES S

FERENCE & ASSOCIATES

409 BROAD STREET

PITTSBURGH, PA 15143

ART UNIT

PAPER NUMBER

2626

DATE MAILED: 12/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/821,404

Applicant(s)

EIDE, ELLEN M.

Examiner

James S. Wozniak

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. In response to the office action from 5/11/2006, the applicant has submitted a request for continued examination, filed 9/1/2006, amending claims 1, 13, and 25, while arguing to traverse the art rejection based on the amended limitations (*Amendment, Pages 8-9*). The applicant's arguments have been fully considered but are moot with respect to the new grounds of rejection in view of Kirchoff ("*Robust Speech Recognition Using Articulatory Information*," 1999).

Response to Arguments

2. The applicant argues that the Final Office Action from 3/1/2006 is improper (*cited MPEP portion does not apply to the present situation [RCE filed under 37 CFR 1.114] because it refers to a "new application," Amendment, Page 9*). In response, the examiner points out that this section of the MPEP (*MPEP 706.07 (b)*) does, in fact, further recite that a First Action Final Office Action following an RCE filed under 37 CFR 1.114 is proper provided that:

"All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114" (*MPEP 706.07 (b)*).

In the present case, the claims from the RCE filed on 12/19/2005, are *identical* to the previously submitted claims (amendment filed 6/15/2005) because none of the claims in the RCE were amended. Since the claims in the RCE were *not amended*, they could have been finally rejected on the *same grounds and same art of record* in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Furthermore, the applicant argues that the final Office action was improper because examiner did not comply with MPEP 706.07 (b) in that the required form paragraphs were not used in the 3/1/2006 Office action. In response, the examiner points out that the lack of such a form paragraph does not render a first action final rejection improper because the MPEP merely *suggests* using such paragraphs and does not require their use in this instance.

Thus, the examiner maintains that First Action Final Office Action from 3/1/2006 is proper.

Claim Objections

3. **Claims 1-12** are objected to because of the following informalities:

In claim 1, line 1, “facilitations” should be changed to –facilitating--.

In claim 1, lines 4-5, the phrase “wherein the models reflects” appears to be incomplete and should be changed to –wherein the model reflects whether or not each feature is present-- to be made consistent with the similar limitations in claims 13 and 25 (*see statement that all independent claims contain the same previously unclaimed limitation, Amendment, pages 8-9*).

Dependent **claims 2-12** fail to overcome the objection directed towards claim 1, and thus, are also objected to due to minor informalities.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. **Claims 1-25** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1, 13, and 25 are directed towards a method, apparatus, and computer program stored on a program storage device for facilitating speech recognition, which involve the manipulation of linguistic feature data in an abstract model through a ranking algorithm to rebuild the abstract model. Although the presently claimed invention includes a step for obtaining “real-world” speech input data, the recited linguistic features are not tied to such “real-world” speech data in the claim, and thus, represent abstract data.

Secondly, as per MPEP 2106, a “claimed invention as a whole must accomplish a practical application” in that it must produce a “useful, concrete and tangible result.” In the present case, the claimed invention processes *abstract* speech data using a mathematical ranking algorithm to produce modified speech (*non-meaningful*) data models as a result. This result is *not tied to any practical “real-world” application*, and thus, is *not directed to any “useful, concrete, and tangible result.”* Although each preamble mentions an *intended use* in facilitating

speech recognition, the body of each claim does not refer to any such recognizing, and thus, the preambles are given no patentable weight (See MPEP 2111.02 (II)). As applying the rebuilt models to a speech recognition system to recognize input speech would represent a “useful, concrete, and tangible result,” the examiner suggests amending the claim accordingly to overcome this aspect of the noted 35 U.S.C. 101 rejection.

Dependent **claims 2-12 and 14-24** do not overcome the 35 U.S.C. 101 rejection directed towards independent claims 1, 13, and 25, and thus, are also rejected as being drawn to non-statutory subject matter.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1-7, 9-19, and 21-24** are rejected under 35 U.S.C. 102(b) as being anticipated by Kirchoff (“*Robust Speech Recognition Using Articulatory Information*,” 1999).

With respect to **Claims 1 and 13**, Kirchoff discloses:

Obtaining speech input data (*speech signal training input*, Page 38, Section, 3.2.1; and *input feature space*, Page 48, Section 3.2.3);

Building a model for each feature of an original set of linguistic features, wherein the model reflects whether or not each feature is present (*articulatory (linguistic) feature space*

components that model a set of articulatory features, Section 3.2.3, Page 48, and corresponds to probably values that indicate the presence of a particular feature, Pages 50-53, Section 3.2.3);

Ranking the linguistic features (*ranking articulatory features for elimination based on probability distributions, Pages 50-53, Section 3.2.3*); and

Rebuilding the model for each of a preselected number N of the ranked linguistic features (*building a reduced articulatory feature model, Pages 50-53*).

With respect to **Claims 2 and 14**, Kirchoff further discloses:

Building a model for the top N ranked features (*selecting the top 18 features, Page 52, Section 3.2.3*).

With respect to **Claims 3 and 15**, Kirchoff further recites:

Compiling a confusion matrix for each feature of the original set of features subsequent to said step of building a model for each feature of an original set of features (*constructing and analyzing confusion matrices, Page 59, Section 3.2.3*).

With respect to **Claims 4 and 16**, Kirchoff further discloses:

Computing a score for each feature based on the likelihood of its presence in a frame of the speech input data (*probability measure as a log-likelihood, Page 69, Section 3.4*).

With respect to **Claims 5 and 17**, Kirchoff further discloses:

Computing a score as a log likelihood ratio (*log-likelihood probability values, Page 69, Section 3.4 and 91, Section 4.5.1*).

With respect to **Claims 6 and 18**, Kirchoff further discloses:

Comparing each score of each feature with a threshold (*probability based threshold comparison for feature elimination, Page 50, Section 3.2.3*).

With respect to **Claims 7 and 19**, Kirchoff further discloses:

Calculating mutual information between truth and labels for each feature (*mutual information calculation, Page 79, Section 4.1.2*).

With respect to **Claims 9, 11, 21, and 23**, Kirchoff further discloses speech feature partitioning and the production of an acoustic observation vector (*Pages 10-11, Section 2.1.1*).

With respect to **Claims 10, 12, 22, and 24**, Kirchoff further discloses dividing an observation vector for higher level classification and producing an output observation vector (*Page 45, Section 3.2.2*).

8. **Claim 25** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kirchoff in view of official notice.

With respect to **Claim 25**, Kirchoff teaches the method of linguistic feature selection in building a speech recognition unit as applied to Claim 1. While Kirchoff does not teach it, the examiner takes official notice that it would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the method taught by Kirchoff using a computer program contained on a computer storage device, since computers are conveniently used and their programs easily updated for performing speech recognition operations, while a storage device would offer a means of storing any training databases or other necessary stored information. Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to implement a linguistic feature selection method for recognition model building using a computer program transferable between various machines through the use of a storage device, thus increasing method adaptability, to obtain the invention as specified in Claim 25.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Sakamoto et al (*U.S. Patent: 5,175,793*)- teaches speech recognition model updating based on identified articulatory features in input speech data.

Rigazio et al (*U.S. Patent: 6,513,004*)- Teaches a method for the selection of optimal features that define a particular sound class.

Erler et al ("HMM Representation of Quantized Articulatory Features for Recognition of Highly Confusable Words," 1992)- teaches a speech recognizer based upon articulatory features.


Koreman et al ("*Can We Use the Linguistic Information in the Signal?*" 2000)- discloses the use of phonetic features in automatic speech recognition.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached at (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak
11/21/2006



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